



## CLAIMS

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1. A method of controlling the operating speed of a manufacturing facility comprising the steps of:

determining a desired operating speed, the desired operating speed dependent on at least one economic variable that varies depending on the operating speed; and adjusting the operating speed in response to the determination.

2. The method of claim 1, further including the steps of:

determining a current operating speed of the manufacturing facility; comparing the current operating speed to the desired operating speed; and further adjusting the operating speed in response to the comparison.

3. The method of claim 2, wherein the at least one economic variable is at least one of: a cost of manufacturing, at least one manufacturing inflow, and at least one manufacturing outflow.

4. The method of claim 3, wherein the desired operating speed is determined by calculating the cost of manufacturing, the manufacturing inflow, and the manufacturing outflow at a plurality of potential operating speeds, and selecting the desired operating speed from the potential operating speeds.

5. The method of claim 3, wherein the desired operating speed is determined by calculating a marginal cost of manufacturing, a marginal manufacturing inflow, and a marginal manufacturing outflow at a plurality of marginal potential operating speeds and selecting the desired operating speed from the marginal potential operating speeds and a prior desired operating speed.

6. The method of claim 1, wherein the economic variable is cost of manufacturing, and the cost of manufacturing includes ascertaining the correlation between operating speed and the cost of manufacturing.

7. The method of claim 6, wherein the cost of manufacturing is determined by ascertaining a correlation between operating speed and at least one of the following: the per-unit cost of manufacturing inflows and the usage of manufacturing inflows.

8. The method of claim 7, wherein the correlation between manufacturing cost and operating speed is ascertained by establishing the correlation between

1 manufacturing costs and operating speed of specific equipment or process in a  
2 manufacturing facility.

3 9. The method of claim 7, wherein the correlation between manufacturing  
4 cost and the operating speed of a manufacturing machine includes the manufacturing  
5 inflows during one or more of breaks and production that produces finished product of  
6 unacceptable quality.

7 10. The method of claim 7, wherein the correlation between manufacturing  
8 cost and operating speed for a machine is determined by including usage of  
9 manufacturing inflows associated with breaks.

10 11. The method of claim 7, wherein the correlation between manufacturing  
11 cost and operating speed is ascertained by establishing the correlation between  
12 manufacturing costs and operating speed of groups of at least one of equipment and  
13 processes in a manufacturing facility.

14 12. The method of claim 11, wherein the purchase price of manufacturing  
15 inflows is assigned, from lowest to highest per-unit cost, to increasing levels of the  
16 manufacturing facility's production.

17 13. The method of claim 3, wherein the manufacturing outflow is determined  
18 by ascertaining a correlation between operating speed and sales of at least one of finished  
19 products and byproducts.

20 14. The method of claim 13, wherein the correlation between the operating  
21 speed and sales is ascertained by assigning a plurality of manufacturing outflows to at  
22 least one specific portion of the manufacturing facility's production.

23 15. The method of claim 13, wherein the correlation between operating speed  
24 and sales includes variations in product mix.

25 16. The method of claim 15, wherein the manufacturing outflow is  
26 determined, from highest to lowest per-unit economic value, for increasing levels of the  
27 manufacturing facility's production.

28 17. A method of determining the effect of one or more business transactions  
29 on the economic efficiency of the production of products in a manufacturing facility,  
30 wherein the economic efficiency is dependent on one or more economic variables that  
31 varies dependent on operating speed, comprised of:

1 obtaining the current economic efficiency of the facility;  
2 inputting information on the business transactions that affects the economic  
3 variables;  
4 computing the economic efficiency of the facility with the proposed transaction  
5 leaving the remaining variables constant; and  
6 displaying the information to an end-user.

7 18. The method of claim 17, wherein the operating speed of the manufacturing  
8 facility is dependent on at least one economic variable that varies depending on the  
9 operating speed.

10 19. The method of claim 18, wherein the transactions include at least one of  
11 purchase of inflows, sales of outflows, capital additions, capital subtractions, changes to  
12 equipment, change in product mix.

13 20. The method of claim 18, wherein the business transactions are proposed  
14 business transactions.

15 21. A manufacturing facility operating speed controller comprised of:  
16 means for determining a current operating speed of the manufacturing facility;  
17 means for determining a desired operating speed, the desired operating speed  
18 dependent on at least one economic variable that varies depending on the operating  
19 speed;  
20 means for comparing the current operating speed to the desired operating speed;  
21 and adjusting the current speed in response to the comparison.

22 22. The apparatus of claim 21, wherein the means for determining includes  
23 means for determining a desired operating speed to achieve an optimal operating speed  
24 from at least one of: a cost of manufacturing, at least one manufacturing inflow, and at  
25 least one manufacturing outflow.

26 23. The apparatus of claim 22, wherein the means for determining includes  
27 means for determining a desired operating speed by calculating the cost of  
28 manufacturing, the manufacturing inflow, and the manufacturing outflow at a plurality of  
29 potential operating speeds and selecting the desired operating speed from the potential  
30 operating speeds.

1           24.     The apparatus of claim 22, wherein the means for determining include  
2 means for determining a desired operating speed by calculating a marginal cost of  
3 manufacturing, a marginal manufacturing inflow, and a marginal manufacturing outflow  
4 at a plurality of marginal potential operating speeds and selecting the desired operating  
5 speed from the marginal potential operating speeds.

6           25.     The apparatus of claim 23, wherein the means for determining include  
7 means for determining a desired operating speed by ascertaining the correlation between  
8 operating speed and the cost of manufacturing.

9           26.     The apparatus of claim 25, including means for determining the variable  
10 cost of manufacturing by ascertaining a correlation between operating speed and at least  
11 one of the following: the per-unit cost of manufacturing inflows and the usage of  
12 manufacturing inflows.

13          27.     The apparatus of claim 24, further including means for determining  
14 manufacturing outflows by ascertaining a correlation between operating speed and sales  
15 of at least one of finished products and byproducts.

16          28.     The apparatus of claim 27, wherein the means for ascertaining includes  
17 means for correlating the manufacturing outflows by assigning different economic values  
18 of manufacturing outflow with specific portions of the manufacturing facility's  
19 production.

20          29.     The apparatus of claim 28, further includes means for determining the at  
21 least one of manufacturing outflows from highest to lowest per-unit economic value, to  
22 increasing levels of the manufacturing facility's production.

23          30.     An apparatus for determining the effect of one or more business  
24 transactions on the economic efficiency of the production of products in a manufacturing  
25 facility, wherein the economic efficiency is dependent on one or more economic  
26 variables that varies dependent on operating speed, comprised of:

27               means for obtaining the current economic efficiency of the facility;  
28               means for inputting information on the business transactions that affects the  
29 economic variables;

30               means for computing the economic efficiency of the facility with the proposed  
31 transaction leaving the remaining variables constant; and

1 means for displaying the information to an end-user.

2 31. The apparatus of claim 30, wherein the means for computing includes  
3 means for computing economic efficiency using a operating speed of the manufacturing  
4 facility dependent on at least one economic variable that varies depending on the  
5 operating speed.

6 32. The apparatus of claim 30, wherein the means for inputting information  
7 includes means for inputting information on at least one of purchase of inflows, sales of  
8 outflows, capital additions, capital subtractions, changes to equipment, change in product  
9 mix.

10 33. An article of manufacture comprising:

11 a computer usable medium having computer readable program code embodied  
12 therein for determining a desired operating speed of a facility comprising:

13 computer readable program code means for receiving as an economic input at  
14 least one economic variable that varies depending on the operating speed;

15 computer readable program code means for determining the desired speed, the  
16 desired speed being dependent on the economic input; and

17 computer readable program code means for outputting the optimal speed; said  
18 optimal speed being inputted into said manufacturing facility in conjunction with a  
19 computer system.

20 34. The article of claim 33, further including:

21 computer readable program code means for determining a current operating speed  
22 of the manufacturing facility;

23 computer readable program code means for comparing the current operating  
24 speed to the desired operating speed; and

25 computer readable program code means for further adjusting the current speed in  
26 response to the comparison.

27 35. The article of claim 33, wherein the means for determining includes  
28 computer readable program code means for determining a desired operating speed from  
29 at least one of: cost of manufacturing, manufacturing inflows, and manufacturing  
30 outflows.

1           36.     The article of claim 35, wherein the means for determining includes  
2 computer readable program code means for determining a desired operating speed by  
3 calculating the cost of manufacturing, the manufacturing inflow, and the manufacturing  
4 outflow at a plurality of potential operating speeds and selecting the desired operating  
5 speed from the potential operating speeds.

6           37.     The article of claim 35, wherein the means for determining includes  
7 computer readable program code means for determining a desired operating speed by  
8 calculating a marginal cost of manufacturing, a marginal manufacturing inflow, and a  
9 marginal manufacturing outflow at a plurality of marginal potential operating speeds and  
10 selecting the desired operating speed from the marginal potential operating speeds that  
11 contribute to achieving optimal operating speeds.

12           38.     The article of claim 37, wherein the economic variable is cost of  
13 manufacturing, and further including computer readable program code means for  
14 ascertaining the correlation between operating speed and the cost of manufacturing.

15           39.     The article of claim 38, further including computer readable program code  
16 means for ascertaining a correlation between operating speed and at least one of the  
17 following: the per-unit cost of manufacturing inflows and the usage of manufacturing  
18 inflows.

19           40.     The article of claim 38, further including computer readable program code  
20 means for establishing the correlation between manufacturing costs and operating speed  
21 of specific equipment or process in a manufacturing facility.

22           41.     The article of claim 38, further including computer readable program code  
23 means for correlating the manufacturing cost and the operating speed of a machine  
24 including the manufacturing inflows utilized during one or more of breaks and to periods  
25 in which finished product of unacceptable quality is produced, measured by including  
26 such manufacturing inflows utilized with other manufacturing inflows utilized in the  
27 machine operation.

28           42.     The article of claim 38, further including computer readable program code  
29 means for correlating the manufacturing cost and operating speed for a machine by  
30 including usage of manufacturing inflows associated with breaks and finished goods of  
31 unacceptable quality.

1           43.     The article of claim 38, further including computer readable program code  
2 means for correlating the manufacturing cost and operating speed by establishing the  
3 correlation between manufacturing costs and operating speed of groups of equipment or  
4 processes in a manufacturing facility.

5           44.     The article of claim 42, further including computer readable program code  
6 means for assigning the purchase price of manufacturing inflows from lowest to highest  
7 per-unit cost, to increasing levels of the manufacturing facility's production.

8           45.     The article of claim 37, further including computer readable program code  
9 means for ascertaining a correlation between operating speed and sales of at least one of  
10 finished products and byproducts.

11          46.     The article of claim 38, further including computer readable program code  
12 means for assigning different economic values of manufacturing outflows to specific  
13 portions of the manufacturing facility's production.

14          47.     The article of claim 45 further including computer readable program code  
15 means for correlating operating speed and sales by including variations in product mix.

16          48.     The article of claim 43, further including computer readable program code  
17 means for assigning the manufacturing outflow from highest to lowest per-unit economic  
18 value, to increasing levels of the manufacturing facility's production.

19          49.     An article of manufacture comprising:

20           a computer usable medium having computer readable program code embodied  
21 therein for determining the effect of one or more business transactions on the economic  
22 efficiency of the production of products in a manufacturing facility, wherein the  
23 economic efficiency is dependent on one or more economic variables that varies  
24 dependent on operating speed, comprised of:

25           computer readable program code means for obtaining the current economic  
26 efficiency of the facility;

27           computer readable program code means for inputting information on the business  
28 transactions that affects the economic variables;

29           computer readable program code means for computing the economic efficiency of  
30 the facility with the proposed transaction leaving the remaining variables constant; and

1 computer readable program code means for displaying the information to an end-  
2 user.

3 50. The article of claim 48 further including computer readable program code  
4 means for determining the economic efficiency using at least one economic variable that  
5 varies depending on the operating speed.

6 51. The article of claim 48, wherein the means for inputting information  
7 includes computer readable program code means for inputting information on at least one  
8 of purchase of inflows, sales of outflows, capital additions, capital subtractions, changes  
9 to equipment, change in product mix.

10 52. The method of claim 1 wherein said manufacturing facility is a process  
11 manufacturing facility.

12 53. The method of claim 17 wherein said manufacturing facility is a process  
13 manufacturing facility.

14 54. The manufacturing facility operating speed controller of claim 21 wherein  
15 said manufacturing facility is a process manufacturing facility.

16 55. The apparatus of claim 30 wherein said manufacturing facility is a process  
17 manufacturing facility.

18 56. The article of claim 33 wherein said manufacturing facility is a process  
19 manufacturing facility.

20 57. The article of claim 49 wherein said manufacturing facility is a process  
21 manufacturing facility.

22 58. The method of claim 1 wherein said at least one economic variable is  
23 determined in real time.

24 59. The method of claim of 58 wherein said at least one economic variable is  
25 determined using Internet.

26 60. A method of controlling the operating speed of a papermaking facility  
27 comprising the steps of:

28 determining a desired operating speed;

29 the desired operating speed dependent on at least one economic variable that

30 varies depending on the operating speed;

31 determining a current operating speed;



1        said desired operating speed being different than said current operating speed;  
2        adjusting said operating speed based on said desired operating speed.

3        61.     A papermaking facility operating speed controller comprising;  
4        means for determining a current operating speed of said papermaking facility;  
5        means for determining a desired operating speed; the desired operating speed dependent  
6        on at least one economic variable that varies depending on the operating speed;  
7        said desired operating speed being different than said current operating speed;  
8        means for comparing the current operating speed to the desired operating speed and  
9        adjusting the current speed in response to the comparison.

10       62.     The method of claim 60 wherein the at least one economic variable is at  
11       least one of: a cost of manufacturing, at least one manufacturing inflow, and at least one  
12       manufacturing outflow.

13       63.     The method of claim 62 wherein the manufacturing inflow is selected  
14       from the group comprising: pulpwood, wood chips, secondary or post-consumer  
15       recyclable fiber, purchased virgin pulp, purchased secondary or post consumer pulp,  
16       water, pulping chemicals, bleaching chemicals, paper additive chemicals, electricity,  
17       fossil fuels of any type, purchased steam, paper machine felts, paper machine wires, labor  
18       costs, effluent treatment chemicals and paper finishing chemicals.

19       64.     The method of claim 60 the economic variable is cost of manufacturing,  
20       and the cost of manufacturing includes ascertaining the correlation between operating  
21       speed and the cost of manufacturing.

22       65.     The method of claim 64 wherein the cost of manufacturing is determined  
23       by ascertaining a correlation between operating speed and at least one of the following:  
24       the per unit cost of manufacturing inflows and the usage of manufacturing inflows.

25       66.     The method of claim 65 wherein the correlation between manufacturing  
26       cost and operating speed is ascertained by establishing the correlation between  
27       manufacturing costs and operating speed of specific equipment or process in a paper  
28       manufacturing facility;

29       said equipment being selected from the group comprising; debarkers, chippers,  
30       digesters, grinders, pulp manufacturing refiners, screening equipment, washers, bleaching  
31       equipment, stock preparation refiners and chests, cleaners, paper machines, off-machine

1 finishing equipment, roll wrapping and handling, and converting equipment and any  
2 combination thereof.

3 67. The method of claim 62 wherein the manufacturing outflow include:  
4 paper, pulp or converted paper, steam, fertilizer filler, spent chemicals or electricity.

5 68. The method of claim 60 wherein said economic variable relates to  
6 availability of wood through recent purchases and all intervening steps throughout  
7 production from wood to pulp held in high density storage for a machine.

8 69. The method of claim 60 wherein said economic variable relates to  
9 procuring wood in the forest and selling of finished product.

10 70. The method of claim 66 wherein said equipment is a digester and said  
11 desired operating speed is based on current efficiency of bleach plant.

12 71. The method of claim 62 wherein the summation of said cost of  
13 manufacturing are compared to available options for potential product sales net of freight  
14 and other customer specific costs to compute possible contribution options; if said  
15 options are less than a minimum contribution that has been established, said operating  
16 speed is reduced.

17 72. An apparatus that displays financial performance of a facility or marginal  
18 transaction at a plurality of facility throughputs by inputting at least one of individual  
19 manufacturing inflow purchase transaction's cost or quantity, individual manufacturing  
20 outflow sales transaction's price and quantity, manufacturing usages at different  
21 operating rates and calculating said financial performance by subtracting net selling price  
22 from result of multiplying the manufacturing usage by the manufacturing inflow purchase  
23 price.

24 73. The apparatus of claim 72, where the manufacturing inflow transactions  
25 and outflows of transactions are assigned to particular levels of facility throughput.

26 74. The apparatus of claim 73, where assignment of outflows to levels of  
27 throughput is based on a decreasing per unit sales price of a given product.

28 75. The apparatus of claim 73, where assignment of inflows is based on  
29 increasing per unit purchase price of raw materials.

30 76. The apparatus of claim 72, where the manufacturing usage required to  
31 achieve a higher operating rate are assigned to the incrementally higher operating rate.

1        77.        The apparatus of claim 72, where the manufacturing usage for a paper  
2 machine at different levels of throughput include at least one of pulp, electricity, steam,  
3 chemicals, water, effluent treatment, paper machine wires and felts.

4        78.        The apparatus of claim 72, where the financial performance of each grade  
5 manufactured by a paper company is analyzed and arranged.

6        79.        A method of controlling operating rate of a facility by selecting highest  
7 operating speed in a given period of time that results in positive contribution on a  
8 marginal unit.

9